PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
WY/sd 021035WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IB2002/004630	05-11-2002	---
International Patent Classification (IPC) or national classification and IPC		
G01C17/28		
Applicant		
NOKIA CORPORATION ET AL		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 5 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11-05-2004	14-02-2005
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IB2002/004630

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-19 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 20-24 received by this Authority on 13-09-2004

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-4 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/IB2002/004630

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-23	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-23	NO
Industrial applicability (IA)	Claims	1-23	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The most relevant documents cited in the International Search Report:

D1: US2002056202
D2: US2002100178
D3: JP2002168629
D4: WO02009396

D1 discloses a three-axis (3D) magnetic sensor (part 0008) built into, as an example, a cellular phone (part 0053). The device furthermore comprises a tilt sensor to detect acceleration and displacement (part 0012). The displayed data is aligned with and dependent on the direction of the cellular phone (part 0048).

D2 describes a three-axis compass. The compass comprises a magnetometer and is in an example embodiment made as a mobile electronic system (part 0056). The result is graphically displayed as a three-dimensional image (figures 1, 2 and 4). Digital filters are suggested (part 0135). Axis or data may be displayed (part 0042).

D3 describes the concept of a magnetic direction detector for a portable telephone, built-in or externally connected to a portable terminal device. The magnetic sensor has two or more axes (abstract). The picture of the display is interlocked with the device and rotates with the direction of the phone (part 0014).

D4 discloses a mobile phone having a compass as a complementary unit (page 10, line 23 and claim 8), with the indication figures shown on the display.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

The invention according to the amended claims is directed towards a mobile electronic system, comprising a display, a 3D magnetometer where the display mode is selected based on the data from the 3D magnetometer.

Among D1 through D3, D1 is considered to be closest in describing the invention. The invention according to claims 1, 14 and 15 differs from what is disclosed in D1 by stating that the display modes are selected based on the data provided by the magnetometer. The problem solved is an appropriate presentation of data. However, D1, and D3, describes that the displayed data is changed due to the direction of the device. For a person skilled in the art, it is obvious that the mode (an alternative way) of displaying data could also be changed due to the data provided by the magnetometer. The latter is also known from for instance US6111525, as cited in the International Search Report. Accordingly, the invention claimed in claims 1, 14 and 15 does not fulfil the requirement of inventive step.

The invention according to claims 11-13 differs from what is disclosed in D1 by stating that the 3D magnetometer is a complementary unit to a user equipment. The problem solved is an alternative embodiment. D4 describes a mobile phone comprising a compass as a complementary unit. For a person skilled in the art, it is considered obvious that the compass unit described in D4 can also be a 3D compass as disclosed in D1 and he will thus arrive at the invention claimed. Accordingly, the invention claimed in claims 11-13 does not fulfil the requirement of inventive step.

The inventions according to the remaining claims differ from D1 by stating that the output is a 3D compass information, additional sensor means such as an accelerometer or filtering. However, the technical features stated are known from the cited documents or are considered obvious to a person skilled in the art. Consequently, the inventions claimed in claims 2-10 and 16-23 do not fulfil the requirement of inventive step.

The invention is industrially applicable.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 6 is not considered clear in the sense of Article 6 PCT since it describes alternative embodiments.

Claims 12-14 cover all solutions for a unit or an equipment for a mobile electronic system, while the manner of claiming according to Rule 6.3 PCT shall be in terms of those technical features necessary for the claimed subject matter.

Claims

1. Mobile electronic system comprising
   - output means (12,42) enabling a presentation of information to a user of said mobile electronic system;
   - a 3D magnetometer (51) performing magnetic measurements in three dimensions and providing data indicative of the current posture of said mobile electronic system based on said measurements; and
   - processing means (52,54) processing said data provided by said 3D magnetometer (51) for enabling a posture related presentation of information via said output means (12,42), including selecting one of at least two different modes of presentation based on said data provided by said 3D magnetometer.

2. Mobile electronic system according to claim 1, wherein said processing means present compass information (13,14,15,43-46) via said output means (12,42) based on said data provided by said 3D magnetometer.

3. Mobile electronic system according to claim 2, wherein said output means comprise a 3D display (42) on which said compass information (43-46) is presented.

4. Mobile electronic system according to claim 3, wherein said processing means present a floating compass (43-46) on said 3D display (42) based on said data provided by said 3D magnetometer.

5. Mobile electronic system according to one of the preceding claims, further comprising additional sensor means (50) providing additional measurement data, wherein said processing means use said additional measurement data in addition for enabling a posture related presentation of information (43-46) via said output means (42).

6. Mobile electronic system according to claim 5, wherein said processing means use said additional measurement data provided by said additional sensor means at least for one of the following: adjusting a presentation of information via said output means and filtering signals provided by said 3D magnetometer.

7. Mobile electronic system according to claim 5 or 6, wherein said sensor means comprise a 2D or 3D linear accelerometer measuring the acceleration of said mobile electronic system in three dimensions.

8. Mobile electronic system according to one of claims 5 to 7, wherein said sensor means comprise a 3D angular accelerometer (50) measuring the angular acceleration of said mobile electronic system in three dimensions.

9. Mobile electronic system according to claim 8, wherein said 3D magnetometer (51) provides first data indicating a current heading of said mobile

electronic system, wherein said 3D angular accelerometer (50) provides second data indicating a current heading of said mobile electronic system, and wherein said processing means comprise a complementary filter (52-54) combining said first and said second data indicating a current heading of said mobile electronic system.

10. Mobile electronic system according to one of the preceding claims realizing an inertial navigation system.

11. Mobile electronic system according to one of the preceding claims, wherein at least said output means are comprised in a user equipment, wherein at least said 3D magnetometer is comprised in a complementary unit external to said user equipment, wherein said user equipment and said complementary unit comprise respective connection means rigidly and electrically connecting said complementary unit and said user equipment for providing signals which are based on magnetic measurements of said 3D magnetometer to said user equipment.

12. Complementary unit for a mobile electronic system according to claim 11.

13. User equipment for a mobile electronic system according to claim 11.

14. User equipment comprising a mobile electronic system according to one of claims 1 to 11.

15. Method for use in a mobile electronic system, said method comprising:
    - performing magnetic measurements in three dimensions in said mobile electronic system;
    - determining data indicative of the current posture of said mobile electronic system based on said performed magnetic measurements; and
    - processing said data for enabling a posture related presentation of information to a user of said mobile electronic system, said processing comprising selecting one of at least two different modes of presentation based on said data indicative of the current posture of said mobile electronic system.

16. Method according to claim 15, comprising presenting compass information (13,14,15,43-46) obtained in said processing.

17. Method according to claim 16, comprising presenting said compass information (43-46) on a 3D display (42).

18. Method according to claim 17, comprising presenting a floating compass (43-46) on a 3D display (42).

19. Method according to one of claims 14 to 18, further comprising performing additional measurements in said mobile electronic system, wherein said processing is based in addition on measurement data resulting in said additional measurements.

20. Method according to claim 19, wherein said processing comprises using said additional measurement data at least for one of the following: adjusting a presentation of information and filtering signals resulting in said performed magnetic measurements.

21. Method according to claim 19 or 20, wherein performing said additional measurements comprises measuring the acceleration of said mobile electronic system in three dimensions.

22. Method according to one of claims 19 to 21, wherein performing said additional measurements comprises measuring the angular acceleration of said mobile electronic system in three dimensions.

23. Method according to claim 22, wherein said processing comprises combining first data indicating a current heading of said mobile electronic system and second data indicating a current heading of said mobile electronic system by a complementary filtering, which first data is based on said magnetic measurements and which second data is based on said angular acceleration measurement.